for Residential Construction with BCI® Joists, VERSA-LAM® and BC Rimboard Products
Residential Floor Span Tables

Homeowner’s expectations and opinions vary greatly due to the subjective nature of rating a new floor. Communication with the ultimate end user to determine their expectation is critical. Vibration is usually the cause of most complaints. Installing lateral bridging may help, however, squeaks may occur if not installed properly. Spacing the joists closer together does little to affect the perception of the floor’s performance. The most common methods used to increase the performance and reduce vibration of wood floor systems is to increase the joist depth, limit joist deflections, glue and screw a thicker, tongue-and-groove subfloor, install the joists vertically plumb with level-bearing supports, and install a direct-attached ceiling to the bottom flanges of the joists.

The floor span tables listed below offer three very different performance options, based on performance requirements of the homeowner.

### Eastern Product Profiles

**BCI® Joists**

<table>
<thead>
<tr>
<th>Joist Depth</th>
<th>BCI® Joist Series</th>
<th>Allowable Holes in VERSA-LAM®</th>
<th>Allowable Nail Spacing</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>9½&quot;</td>
<td>12&quot; o.c.</td>
<td>1½&quot;</td>
<td>12&quot; o.c.</td>
<td>16&quot; o.c.</td>
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<tr>
<td>11⅞&quot;</td>
<td>12&quot; o.c.</td>
<td>1½&quot;</td>
<td>12&quot; o.c.</td>
<td>16&quot; o.c.</td>
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<td>14&quot;</td>
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<td>1½&quot;</td>
<td>12&quot; o.c.</td>
<td>16&quot; o.c.</td>
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</tbody>
</table>

### About Floor Performance

- **Three Star**:Floor joists made of BCI® and VERSA-LAM® products shall be installed in dry-use applications only, per their respective ICC ESR evaluation reports. Some products may not be available in all markets. Contact your Boise Cascade EWP representative for availability. BCI® and VERSA-LAM® products shall be installed in dry-use applications only, per their respective ICC ESR evaluation reports.

- **Four Star**:Floor joists made of BCI® and VERSA-LAM® products shall be installed in dry-use applications only, per their respective ICC ESR evaluation reports. Some products may not be available in all markets. Contact your Boise Cascade EWP representative for availability. BCI® and VERSA-LAM® products shall be installed in dry-use applications only, per their respective ICC ESR evaluation reports.

### Residential Floor Span Tables

- **Live Load deflection limited to L/480**: The common industry and design community standard for residential floor joists, 33% stiffer than L/360 code minimum. However, floor performance may still be an issue in certain applications, especially with 9½" and 11⅞" deep joists without a direct-attached ceiling.

- **Live Load deflection limited to L/860+: In addition to providing a floor that is 100% stiffer than the three star floor, field experience has been incorporated into the values to provide a floor with a premium performance level for the more discriminating homeowner.

**CAUTION**

- **Minimum Stiffness Allowed by Code**:Floors that meet the minimum building code L/360 criteria are structurally sound to carry the specified loads; however, there is a much higher risk of floor performance issues. This table should only be used for applications where floor performance is not a concern.

**CAUTION**

- **Floor performance is not a concern.**

### Table of Contents

- **Product Profiles, About Floor Performance, BCI® Residential Floor Span Tables**
- **BCI® Floor Framing Details**
- **BCI® Joist Hole Location & Sizing**
- **VERSA-LAM® One Floor Beam Span Tables**
- **VERSA-LAM® Two Floor Beam Span Tables**
- **VERSA-LAM® Roof Header Span Tables**
- **VERSA-LAM® Roof Ridge Beam Span Tables**

### Remarks

- **Span values assume ½" minimum plywood or OSB rated sheathing is glued and nailed to joists for composite action (joists spaced at 32" o.c. require sheathing rated for such spacing; ⅝" plywood/OSB).
- **Span values represent the most restrictive of single or multiple span applications.** Analyze multiple span joists with BC CALC® sizing software if the length of any span is less than half the length of an adjacent span.
- **Span values are the maximum allowable clear distance between supports.**
- **Table values assume minimum bearing lengths without web stiffeners for joist depths of 16" inches and less.**
- **Floor file will increase dead load and may require specific deflection limits, contact Boise Cascade EWP Engineering for further information.**
- **This table was designed to apply to a broad range of applications. It may be possible to exceed the limitations of this table by analyzing a specific application with the BC CALC® sizing software.**

(Shaded values do not satisfy the requirements of the North Carolina State Building Code. Refer to the THREE STAR table when spans exceed 20 feet.)
**BCI® Floor Framing Details**

**END BEARING DETAILS**

- **Top Flange or Face Mount Joist Hanger**
  - VERSA-LAM®
  - For load bearing wall above (stacked over wall below).

- **Double 2 x _ lumber**
  - Dimension lumber is not suitable for use as rim board with BCI® Joists.

- **Nail Boise Rimboard to BCI® Joists with 8d nail each into flange.**

**INTERMEDIATE BEARING DETAILS**

- **Double Squash Block Vertical Load (lb/ft)**
  - | Size | Bearing | Joist Spacing [in] |
  - |     |         |                  |
  - | 12  | 16  | 19.2 | 24  |
  - | 2x4 | 4463 | 3347 | 2789 | 2231 |
  - | 2x6 | 7013 | 5259 | 4363 | 3506 |
  - **Note:** BCI® floor joist must be designed to carry wall above when not stacked over wall below.

- **BCI® Joist Slope Cut Reinforcement**
  - BCI® Joist shall not be used as a collar or rafter tension tie.
  - 2 x 6 min. rafter. Rafter shall be supported by ridge beam or other upper bearing support.
  - BCI® Joist blocking shall be designed to carry wall above when not stacked over wall below.

**LATERAL SUPPORT**

- **BCI® Joists shall be laterally supported at the ends with hangers, rimboard, BCI® rim joist or blocking panels.**
- **Blocking may be required at intermediate bearings for floor diaphragm per IRC in high seismic areas, consult local building official.**

**MINIMUM BEARING LENGTH FOR BCI® JOISTS**

- **Minimum end bearing:** 1½" for BCI® 4500s, 5000s, 6000s & 6500s; 1¾" for BCI® 60s & 90s. ¾" is required at cantilever and intermediate supports.
- **Longer bearing lengths allow higher reaction values. Refer to the building code evaluation report or the BC CALC® software.**

**NAILING REQUIREMENTS**

- **BCI® rim joist, rim board or closure panel to BCI® joist:**
  - Rims or closure panel 1¼ inches thick and less:
  - 2-8d nails, one each in the top and bottom flange.
  - BCI® 4500s, 5000s rim joist: 2-10d box nails, one each in the top and bottom flange.
  - BCI® 6000s, 60s rim joist: 2-16d box nails, one each in the top and bottom flange.
  - BCI® 6500s, 90s rim joist: Toe-nail top flange to rim joist with 2-10d box nails, one each side of flange.
- **BCI® rim joist, rim board or BCI® blocking panel to support:**
  - 8d nails at 6 inches on center.
  - When used for shear transfer, follow the building designer’s specification.

**WEB STIFFENER REQUIREMENTS**

- See Web Stiffener Requirements on page 9 of the Eastern Specifier Guide.

**PROTECT BCI® JOISTS FROM THE WEATHER**

- BCI® Joists are intended only for applications that provide permanent protection from the weather. Bundles of BCI® Joists should be covered and stored off the ground on stickers.

**BCI® RIM JOISTS AND BCI® BLOCKING**

- **MINIMUM BEARING LENGTH FOR BCI® JOISTS**
  - BCI® Joists shall be supported laterally at each end with hangers, rimboard, BCI® blocking, or at least 1½ inches minimum from the end of the BCI® Joist to limit splitting.
  - Sheathing to BCI® blocking or blocking not applicable for rim joists.
  - Squash blocks are to be in full contact with upper floor and lower wall plate.
  - Sheathing to BCI® blocking or blocking.
  - Sheathing to BCI® blocking or blocking not applicable for rim joists.
  - Maximum nail spacing for minimum lateral stability: 2-8d nails, one each in the top and bottom flange.
  - Rims or closure panel 1¼ inches thick and less: 2-8d nails, one each in the top and bottom flange.
  - Rims or closure panel 1½ inches thick and less: 2-8d nails, one each in the top and bottom flange.

**BACKER AND FILLER BLOCK DIMENSIONS**

- | Series | Backer Block Thickness | Filler Block Thickness |
  - | 4500s 1.8 | 6000s 1.8 | 6500s 1.8 |
  - | 100% wood panels | 2 x ½ wood panels or 2 x | 2 x ¼ wood panels or 2 x |
  - | 5000s 1.8 | 6000s 1.8 | 6500s 1.8 |
  - | 100% wood panels | 2 x ½ wood panels or 2 x | 2 x ¼ wood panels or 2 x |
  - | 60s 2.0 | 60s 2.0 | 60s 2.0 |
  - | 2 x ½ wood panels | 2 x ¼ wood panels or 2 x | 2 x ¼ wood panels or 2 x |
  - | 90s 2.0 | 2 x ½ wood panels | Double 2 x ½ wood panels |
  - **Cut backer and filler blocks to a maximum depth equal to the web depth minus ¼” to avoid a forced fit.**

**BCI® Joist Blocking**

- Blocking may be required at intermediate bearings for floor diaphragm per IRC in high seismic areas, consult local building official.

**MINIMUM BEARING LENGTH FOR BCI® JOISTS**

- Minimum end bearing:
  - 1½" for BCI® 4500s, 5000s, 6000s & 6500s; 1¾" for BCI® 60s & 90s.
  - ¾" is required at cantilever and intermediate supports.

**LATERAL SUPPORT**

- **BCI® Joists shall be laterally supported at the ends with hangers, rimboard, BCI® rim joist or blocking panels.**
- **Blocking may be required at cantilever supports.**

**BCI® Joist to support:**

- 2-8d nails, one on each side of the web, placed 1½" inches minimum from the end of the BCI® Joist to limit splitting.

**Sheathing to BCI® Joist:**

- Prescriptive residential floor sheathing nailing requires 8d common nails @ 8" o.c. on edges and @ 12" o.c. in the field (IRC Table R602.3(1)).
- See closest allowable nail spacing limits on page 10 for floor diaphragm nailing specified at closer spacing than IRC.

**Maximum nail spacing for minimum lateral stability:**

- 18" for BCI® 4500s and 5000s; 24" for larger BCI® joist series.
- 14 gauge staples may be substituted for 8d nails if the staples penetrate at least 1 inch into the joist.
- Wood screws may be acceptable, contact local building official or Boise Cascade EWP Engineering for specific conditions.

**WEB STIFFENER REQUIREMENTS**

- See Web Stiffener Requirements on page 9 of the Eastern Specifier Guide.

**PROTECT BCI® JOISTS FROM THE WEATHER**

- BCI® Joists are intended only for applications that provide permanent protection from the weather. Bundles of BCI® Joists should be covered and stored off the ground on stickers.

**BCI® Rim Joists and BCI® Blocking**

- Backer block and filler blocks to a maximum depth equal to the web depth minus ¼” to avoid a forced fit.

**Additional floor framing details available with BC FRAMER® software (visit www.bcewp.com software)**
BCI® Joist Hole Location & Sizing

BCI® Joists are manufactured with 1½" round perforated knockouts in the web at approximately 12" on center.

Minimum distance from support, listed in table below, is required for all holes greater than 1½".

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<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>6½</td>
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<td>8</td>
<td>1'-0&quot;</td>
<td>1'-1&quot;</td>
<td>1'-5&quot;</td>
<td>1'-10&quot;</td>
<td>2'-4&quot;</td>
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<tr>
<td>12</td>
<td>1'-0&quot;</td>
<td>1'-2&quot;</td>
<td>2'-2&quot;</td>
<td>3'-2&quot;</td>
<td>4'-2&quot;</td>
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<tr>
<td>16</td>
<td>1'-0&quot;</td>
<td>1'-7&quot;</td>
<td>2'-11&quot;</td>
<td>4'-3&quot;</td>
<td>5'-7&quot;</td>
</tr>
</tbody>
</table>

Round Hole Diameter [in] 2 3 4 5 6 6½ 7 8 8½ 9 10 11 12 13
Rectangular Hole Side [in] 2 3 4 5 6 6½ 7 8 9 10 11 12 13
Any 9½" Joist 8 1'-0" 1'-1" 1'-5" 1'-10" 2'-4" 2'-7" 2'-10" 3'-4" 3'-9" 5'-0" 5'-8" 7'-2" 9'-6"
Any 11½" Joist 12 1'-0" 1'-2" 1'-6" 1'-10" 2'-6" 3'-7" 3'-11" 4'-3" 5'-0" 5'-8" 6'-5" 7'-7" 9'-2"
Any 14" Joist 16 1'-0" 1'-2" 1'-8" 2'-6" 3'-4" 3'-9" 4'-2" 5'-0" 5'-8" 6'-6" 7'-9" 9'-4"
Any 16" Joist 20 1'-0" 1'-2" 2'-1" 3'-2" 4'-2" 5'-2" 6'-3" 7'-2" 7'-3" 8'-4" 9'-4" 11'-2"

Minimum distance from support, listed in table below, is required for all holes greater than 1½".

Minimum Distance (D) from any support to the centerline of the hole.

<table>
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<tr>
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<td>3</td>
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<td>5</td>
<td>6</td>
<td>6½</td>
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<td>1'-0&quot;</td>
<td>1'-1&quot;</td>
<td>1'-5&quot;</td>
<td>1'-10&quot;</td>
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<tr>
<td>12</td>
<td>1'-0&quot;</td>
<td>1'-2&quot;</td>
<td>2'-2&quot;</td>
<td>3'-2&quot;</td>
<td>4'-2&quot;</td>
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<tr>
<td>16</td>
<td>1'-0&quot;</td>
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Any 9½" Joist 8 1'-0" 1'-1" 1'-5" 1'-10" 2'-4" 2'-7" 2'-10" 3'-4" 3'-9" 5'-0" 5'-8" 7'-2" 9'-6"
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Any 14" Joist 16 1'-0" 1'-2" 1'-8" 2'-6" 3'-4" 3'-9" 4'-2" 5'-0" 5'-8" 6'-6" 7'-9" 9'-4"
Any 16" Joist 20 1'-0" 1'-2" 2'-1" 3'-2" 4'-2" 5'-2" 6'-3" 7'-2" 7'-3" 8'-4" 9'-4" 11'-2"

Large Rectangular Holes in BCI® Joists

Hole size table based on maximum uniform load of 40 psf live load and 10 psf dead load, at maximum spacing of 24" on-center.

Single Span Joist

Multiple Span Joist

Larger holes may be possible for either Single or Multiple span joists; use BC CALC® sizing software for specific analysis.

Notes:
- Additional holes may be cut in the web provided they meet the specifications as shown in the hole distance chart shown above or as allowed using BC CALC® sizing software.
- Select a table row based on joist depth and the actual joist span rounded up to the nearest table span. Scan across the row to the column headed by the appropriate round hole diameter or rectangular hole side. Use the longest side of a rectangular hole. The table value is the closest that the centerline of the hole may be to the centerline of the nearest support.
- The entire web may be cut out. DO NOT cut the flanges. Holes apply to either single or multiple joists in repetitive member conditions.
- For multiple holes, the amount of uncut web between holes must equal at least twice the diameter (or longest side) of the largest hole.
- ½" round knockouts in the web may be removed by using a short piece of metal pipe and hammer.
- Holes may be positioned vertically anywhere in the web. The joist may be set with the ½" knockout holes turned either up or down.
- This table was designed to apply to the design conditions covered by tables elsewhere in this publication. Use the BC CALC® software to check other hole sizes or holes under other design conditions. It may be possible to exceed the limitations of this table by analyzing a specific application with the BC CALC® software.
## VERSA-LAM® Floor & Roof Application Tables

### General Notes
- Table assumes that lateral support is provided at each support and continuously along the top edge and applicable compression edges of the beam.
- Minimum 3-inch end bearing or see BC CALC® software requirements.
- Bearing length specifications assume bearing across the full width of the beam.
- Uniform loading is assumed for all tables.
- Multiple member beams require proper connection schedules.
- Dry service conditions are assumed.
- It may be possible to exceed the limitations of this table by analyzing a specific application with the BC CALC® software.

### Floor Notes (see pages 5, 6, 9)
- Floor loads are 40 psf live load and 10 psf dead load.
- Deflection is limited to L/360 live load and L/240 total load.
- Table based upon either simple or continuous floor joist spans.
- Tables assume a wall weight of 100 plf (pages 6, 9).
- Interior floor support may vary a maximum of 4 feet from centerline (page 9).

### Roof Notes (see pages 7, 8 & 9)
- Always use roof live and dead loads that meet or exceed the required design loading.
- No roof load reductions have been taken.
- Table assumes 2'-0" roof overhang.

### Ridge Beam (see page 8)
- Deflection is limited to L/240 live load and L/180 total load.
- Table based upon either simple or continuous beam span conditions.

### Header (Roof) (see page 7)
- Deflection is limited to L/240 live load and L/180 total load.

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### One Floor Beam Span Table

#### Width of Building Segment [feet]

<table>
<thead>
<tr>
<th></th>
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<tbody>
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<td>1.5/3</td>
<td>3.5 x 7.25</td>
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</tr>
</tbody>
</table>

### Required Beam Depths and Bearing Lengths [in]

**Width**  
- **Supported Spacing**  
- **BEARING LENGTH REQUIREMENTS**  
- **BEARING LENGTHS**

**VERSA-LAM 2.0 3100**

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**Boise Cascade EWP • Eastern Builder Guide • 4/25/2011 r 07/18/2011**
# Two Floor Beam Span Tables

**VERSALAM® 2.0 3100**

### Required Beam Depths and Bearing Lengths [in]

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<th>Load Duration %</th>
<th>100%</th>
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<th>3.5 x 9.5</th>
<th>3.5 x 9.5</th>
<th>3/4 x 7.5</th>
<th>3/4 x 7.5</th>
<th>3/4 x 7.5</th>
<th>3/4 x 7.5</th>
<th>3/4 x 7.5</th>
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<tbody>
<tr>
<td>Width of Building Segment [feet]</td>
<td>20</td>
<td>24</td>
<td>26</td>
<td>28</td>
<td>30</td>
<td>32</td>
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<td>36</td>
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<td>3/4 x 7.5</td>
<td>3/4 x 7.5</td>
</tr>
</tbody>
</table>

See General Notes on page 5.
### Required Beam Depths and Bearing Lengths [in]

#### VERSA-LAM® 2.0 3100

<table>
<thead>
<tr>
<th>Load Duration %</th>
<th>Load [psf]</th>
<th>Rough Opening [Feet]</th>
<th>Width of Building Segment [feet]</th>
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<tbody>
<tr>
<td>125%</td>
<td>20 15</td>
<td>3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25</td>
<td>3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25</td>
</tr>
<tr>
<td>20 20</td>
<td>30 36 40</td>
<td>3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25</td>
<td>3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25</td>
</tr>
<tr>
<td>25 15</td>
<td>30 36 40</td>
<td>3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25</td>
<td>3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25</td>
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<tr>
<td>30 15</td>
<td>40 50</td>
<td>3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25</td>
<td>3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25 3.5 x 7.25</td>
</tr>
</tbody>
</table>

**Key:** Beam Breadth [in] X Beam Depth [in]

- Minimum end bearing 3 inches or see BC CALC® software requirement.
- 4.5 inch bearing length required in shaded areas.
- See General Notes on page 5.
### Roof Ridge Beam Span Tables

**VERSALAM® 2.0 3100**

#### Required Beam Depths and Bearing Lengths [in]

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<td>50/15</td>
<td>40/36</td>
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See General Notes on page 5.
Required Beam Depths and Bearing Lengths [in]

**Width of Building Segment [feet]**

<table>
<thead>
<tr>
<th>Load Duration</th>
<th>20</th>
<th>24</th>
<th>26</th>
<th>28</th>
<th>30</th>
<th>32</th>
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<tr>
<td>Live</td>
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<td>Dead</td>
<td>9</td>
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<td>5.25 x 7.25</td>
<td>5.25 x 7.25</td>
<td>5.25 x 7.25</td>
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<td>5.25 x 7.25</td>
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<tr>
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<td>3.5 x 11.875</td>
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<td>3.5 x 11.875</td>
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<tr>
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<td>5.25 x 11.875</td>
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<td>5.25 x 20</td>
<td>5.25 x 20</td>
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<td>3.5 x 20</td>
<td>3.5 x 20</td>
<td>3.5 x 20</td>
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<td>3.5 x 20</td>
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</tr>
</tbody>
</table>

**Notes:**
- Minimum end bearing 3 inches or see BC CALC®
- 4.5 inch bearing length required in shaded areas.
- See General Notes on page 5.

Boise Cascade EWP • Eastern Builder Guide • 4/25/2011 r 07/18/2011
### BCI® Closest Allowable Nail Spacing

![Nailing Perpendicular to Glue Lines (Wide Face)](image1)

### BCI® Diaphragm Table

<table>
<thead>
<tr>
<th>BCI® Series</th>
<th>Diaphragm Capacity (lb/ft)</th>
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<tr>
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<td>Unblocked</td>
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<td>4500s, 5000s</td>
<td>As permitted for 2x framing in building code</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>6000s, 6500s</td>
<td>As permitted for 3x framing in building code</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>60s, 90s</td>
<td>As permitted for 3x framing in building code</td>
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### Side-Loaded Applications

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<thead>
<tr>
<th>Number of Members</th>
<th>Nailed</th>
<th>⅛” Dia. Through Bolt(1)</th>
<th>⅛” Dia. Through Bolt(1)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2 rows 16d @ 12” o.c.</td>
<td>2 rows 16d @ 24” o.c.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 rows 16d @ 12” o.c.</td>
<td>3 rows 16d @ 24” o.c.</td>
</tr>
<tr>
<td>2</td>
<td>470</td>
<td>705</td>
<td>1010</td>
</tr>
<tr>
<td>3(2)</td>
<td>350</td>
<td>525</td>
<td>755</td>
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<tr>
<td></td>
<td>2(2)</td>
<td>use bolt schedule</td>
<td>1125</td>
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</table>

### Top-Loaded Applications

<table>
<thead>
<tr>
<th>Plies</th>
<th>Depth</th>
<th>Nailing</th>
<th>Maximum Uniform Load From One Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) 1½ plies</td>
<td>Depth 11½” &amp; less</td>
<td>2 rows 16d box/sinker @ 12” o.c.</td>
<td>400 pff</td>
</tr>
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<td>(3) 1½” plies</td>
<td>Depth 14” - 18”</td>
<td>3 rows 16d box/sinker @ 12” o.c.</td>
<td>600 pff</td>
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<tr>
<td>(2) 1½” plies</td>
<td>Depth 18” &amp; less</td>
<td>2 rows ½” bolts @ 24” o.c., staggered</td>
<td>335 pff</td>
</tr>
<tr>
<td>(4) ½” plies</td>
<td>Depth 20”-24”</td>
<td>3 rows ½” bolts @ 24” o.c., staggered every 8”</td>
<td>505 pff</td>
</tr>
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### Designing Connections for Multiple VERSA-LAM® Members

When using multiple ply VERSA-LAM® beams to create a wider member, the connection of the plies is as critical as determining the beam size. When side loaded beams are not connected properly, the inside plies do not support their share of the load and thus the load-carrying capacity of the full member decreases significantly. The following is an example of how to size and connect a multi-ply VERSA-LAM® floor beam.

**Given:** Beam shown below is supporting residential floor load (40 psf live load, 10 psf dead load) and is spanning 16'-0". Beam depth is limited to 14’.

**Find:** A multiple 1½" ply VERSA-LAM® that is adequate to support the design loads and the member’s proper connection schedule.

1. Calculate the tributary width that beam is supporting: 14’ / 2 + 18” / 2 = 16’
2. Use PLF tables on pages 28-30 of ESG or BC CALC® to size beam. A Triple VERSA-LAM® 2.0 3100 1½” x 14” is found to adequately support the design loads.
3. Calculate the maximum plf load from one side (the right side in this case).
4. Go to the Multiple Member Connection Table, Side-Loaded Applications, 1½” VERSA-LAM®, 3 members
5. The proper connection schedule must have a capacity greater than the max. side load: Nailed: 3 rows 16d sinkers @ 12” o.c. | 525 pff is greater than 450 pff OK
Bolts: ½” diameter 2 rows @ 12” staggered | 775 pff is greater than 450 pff OK

---

1. Design values apply to common bolts that conform to ANSI/ASME standard B10.21-1981 (ASTM A307 Grades AAB, SAE 4340 (Grades 1 or 2) or higher). A washer not less than the same diameter as the bolt.
2. The nail schedules shown apply to both sides of a 3-member beam.
3. 7" wide beams must be top-loaded or loaded from both sides (lesser side shall be no less than 25% of opposite side).
4. End of Joist
5. Connection values are based upon the 2005 NDS.
6. FastenMaster TrussLok, Simpson Strong-Tie SDS and SDW, and USP WS screws may also be used to connect multiple member VERSA-LAM® beams, contact Boise Cascade EWP Engineering for further information.
**Offset and stagger nail rows from floor sheathing and wall sole plate.**

- Simpson Strong-Tie A35 and LPT4 connectors may be attached to the side VERSA-LAM®. Use nails as specified by Simpson Strong-Tie.

---

**VERSA-LAM® Beams**

**Closest Allowable Nail Spacing**

<table>
<thead>
<tr>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>8d Box</td>
<td>3</td>
<td>1½</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>½</td>
<td>2</td>
<td>½</td>
</tr>
<tr>
<td>8d Common</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
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<tr>
<td>10d &amp; 12d Box</td>
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<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>16d Box</td>
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<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>16d Sinker</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
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<td>6</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

**Nailing Perpendicular to Glue Lines (Wide Face)**

**Nailing Parallel to Glue Lines (Narrow Face)**

**Notes**

1. Square and rectangular holes are not permitted.
2. Round holes may be drilled or cut with a hole saw anywhere within the shaded area of the beam.
3. The horizontal distance between adjacent holes must be at least two times the size of the larger hole.
4. Do not drill more than three access holes in any four foot long section of beam.
5. The maximum round hole diameter permitted is:

<table>
<thead>
<tr>
<th>Beam Depth</th>
<th>Max. Hole Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>5½&quot;</td>
<td>¾&quot;</td>
</tr>
<tr>
<td>7¾&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>9½&quot; and greater</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

6. These limitations apply to holes drilled for plumbing or wiring access only. The size and location of holes drilled for fasteners are governed by the provisions of the National Design Specification® for Wood Construction.

7. Beams deflect under load. Size holes to provide clearance where required.

8. This hole chart is valid for beams supporting uniform load only. For beams supporting concentrated loads or for beams with larger holes, contact Boise Cascade EWP Engineering.

---

**VERSILA-LAM® Products**

**Beam Details**

- Provide moisture barrier at support and lateral restraint.
- ½” air space required between concrete and wood.
- Strips per code if top plate is not continuous over header.
- Verify hanger capacity with hanger literature.
- Straps per code if top plate is not continuous.
- Wood top plate must be flush with inside of wall hanger.
- Do not bevel cut VERSA-LAM® beyond inside face of wall without approval from Boise Cascade EWP Engineering or BC CALC® software analysis.

**VERSILA-LAM® Installation Notes**

- Minimum of ½” air space between beam and wall pocket or adequate barrier must be provided between beam and concrete/masonry.
- Adequate bearing shall be provided. If not shown on plans, please refer to load tables in your region's Specifier Guide.
- VERSA-LAM® beams are intended for interior applications only and should be kept as dry as possible during construction.
- Continuous lateral support of top of beam shall be provided (side or top bearing framing).
If in doubt ask!
For the closest
Boise Cascade EWP distributor,
call 1-800-232-0788 or
visit our website at www.BCewp.com
and CLICK on Distributor

✔ Expert help is just a phone call away
✔ Effective and comprehensive sales/technical literature
✔ Training for you and your builder customers
✔ Easy to use design software
✔ Aggressive advertising and promotion programs
✔ FREE builder-oriented video demonstrating proper installation

Boise Cascade has a proven track record of providing quality wood products and a nationwide building materials distribution network for our customers, helping them to enhance their own businesses.

Boise Cascade Engineered Wood Products build better homes with stronger, stiffer floors using only wood purchased in compliance with a number of green building programs. Take a moment to view our sustainability certification site at http://www.bc.com/sustainability/certification.html or view our green brochure at http://www.bc.com/wood/ewp/Boise_EWP_Green.html.

Boise Cascade Engineered Wood Products throughout North America can now be ordered FSC® Chain-of-Custody (COC) certified, enabling homebuilders to achieve LEED® points under U.S. Green Building Council® residential and commercial green building programs including LEED for Homes and LEED for New Construction. Boise Cascade Engineered Wood Products are available as PEFC® Chain-of-Custody certified, SFI® Chain-of-Custody certified and SFI Fiber-Sourcing certified, as well as NAHB Research Center Green Approved, enabling homebuilders to also obtain green building points through the National Green Building Standard.

BCI® Joists, VERSA-LAM® and ALLJOIST® must be stored, installed and used in accordance with this Installation Guide, building codes and to the extent not inconsistent with this Installation Guide, usual and customary building practices and standards. VERSA-LAM®, ALLJOIST® and BCI® Joists must be wrapped, covered and stored off of the ground on stickers at all times prior to installation. VERSA-LAM®, ALLJOIST® and BCI® Joists are intended only for applications that assure no exposure to weather or the elements and an environment that is free from moisture from any source, or any pest, organism or substance which degrades or damages wood or glue bonds. Failure to correctly store, use or install VERSA-LAM®, ALLJOIST®, and BCI® Joist in accordance with this Installation Guide will void the limited warranty.

For information about Boise Cascade's engineered wood products, including sales terms and conditions, warranties and disclaimers, visit our website at www.BCewp.com

Your Dealer is:

If no dealer is listed, call 1-800-232-0788